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AUTHOR Levy, Yonata
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ABSTRACT

Berko's Wug-Technique, using invented words to test linguistic knowledge, has been used with a wide range of age groups, and test results have been treated identically when obtained from children who controlled fully the construction in question in their spontaneous speech or from children just acquiring it. A study of seven-year-old and two-year-old Hebrew speakers investigated their knowledge of pluralization of real and nonce (invented) nouns. The children's performance on the nonce test was compared to their performance with real nouns in test conditions (for the two-year-olds) and in naturalistc speech (for the seven-year-olds). It was found that the two groups differed significantly in their performance. While the two-year-olds mirrored in their plurals of nonce forms the developmental pattern typical of real nouns, the seven-year-olds' handling of the nonce forms radically departed from this pattern. It is suggested that the internal organization of linguistic knowledge of fluent speakers differs from that of speakers in the process of learning the language. It is also suggested that the nonce-word test may be more adequate for assessing the knowledge of a system as it is being learned than after it has become well-established. (Author/MSE)

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Berko's Wug-Technique Revisited

Yonata Levy

The Hebrew University

Jerusalem, ISRAEL

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Running head: Berko's Wug-Technique

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This work was prepared when the author was a fellow at the Institute for Advanced Studies, The Hebrew University, Jerusalem, Israel. Address for correspondence: The Hebrew University, Jerusalem, Israel.

Abstract

Berko's wug-technique, which refers to the use of invented words to test linguistic knowledge, has been used with a wide range of age groups. The test results have been treated identically when obtained from children who fully controlled the construction in question in their spontaneous speech, or from children who were just acquiring it.

In the present study, a group of seven-year-olds and a group of two-year-old Hebrew speakers were tested for their knowledge of pluralization of real and nonce (invented) nouns. The children's performance on the nonce test was compared to their performance with real nouns in test conditions (for the two-year-olds) and in naturalistic speech (for the seven-year-olds). It was found that the two groups differ significantly in their performance: While the two-year-olds mirror in their plurals of nonce forms the developmental pattern typical of real nouns, the seven-year-olds' handling of the nonce forms radically depart from this pattern.

It is suggested that the internal organization of the linguistic knowledge of fluent speakers differs from that of speakers in the process of learning a language. The nonce-word test may be more adequate for assessing the knowledge of a system still in the process of being learned than that of a well-established linguistic procedure.

Berko's Wug-Technique Revisited

In 1958, J. Berko devised a technique for the assessment of grammatical knowledge which she had used to study children's knowledge of English morphology. This study, as well as the testing procedure that was used, have since become classics.

In Berko's original version of the test (1958) the children, ages 4-7, were shown pictures of unusual items which had no common names in English, and were told what the "names" of these objects were. They were then asked to inflect these nonce words, for example, give the plural of the nonce noun wug, hence the name wug-test.

Child language research has made extensive use of this technique with populations of normal children (e.g., Anisfeld & Gordon, 1968; Graves & Koziol, 1971; Snow, 1980) and retardees (e.g., Dever, 1972; Dever & Gardner, 1970).

Anisfeld and Gordon (1968), and Bryant and Anisfeld (1979), essentially replicated Berko's results with regard to the development of the plural allomorphs in English. Their subjects were six-year-old children. Graves and Koziol (1971) used the same technique and found that certain plural allomorphs were not mastered even by children as old as eight years. Ivimey's subjects (1975) ranged in age between

3;6-9;6 and similar phenomena of non-perfect performance in English morphology were reported. In some studies, a methodological modification was introduced. Work such as Solomon's (1972), who was interested in the effects of the final consonants of the noun singular forms on the choice of plural allomorphs, presented the tests orally without any pictures, while Snow (1980), who tested 7-12 year olds for their knowledge of Dutch morphology, tested her subjects in writing, with no contextual support for interpreting the nonsense items. In other words, in some of the work, Berko's method was taken to its limit--the nonce words were introduced without any indication of what their meanings might be. They were "possible lexical items in English" by virtue of their form alone.

The studies that were mentioned above do not exhaust the work in which the wug-technique had been used. However, I believe that they are fair representatives of this line of research in particular, with respect to two points:

a. They all reported on less than perfect performance with the nonce forms and suggested a developmental sequence for the emergence of morphological and derivational forms in children.

b. However, the subjects in these studies were almost invariably older children, and the wug-test was used to

assess their control of sub-systems (i.e., plural formation) which they had long mastered in their natural speech.

Put differently, despite the fact that the children in these studies were beyond the acquisitional stages of these morphological sub-systems in their natural speech, researchers have reported their results assuming their relevance for the natural course of language acquisiton. The general hypothesis has been that children's performance with nonce words is replicating in significant ways what they did earlier when they acquired real language. The fact that children can handle these tasks later than they do similar tasks with real words was considered relevant to the acquisitional process itself. This was expressed, for example, by Brown (1973) who, when summarizing Berko's work, stated that "...Berko offers independent evidence for the order of acquisition of grammatical morphemes" (p.292). He then proceeded with his efforts to account for the discrepancies between his naturalistic findings and Berko's report assuming that ideally the data from these studies should converge.

Snow, who was likewise vexed by her subjects' well-formed natural speech, vis-a-vis their poor performance on the test items, suggested an explanation for these inconsistencies. She claimed that good naturalistic performance in itself did not testify to rule-governed

behavior since production may precede analysis (see also Clark, 1978). The child who fails to handle nonce (i.e., invented) words, will also do poorly with real words when he hears them for the first time. Snow's position is that until a speaker can perform such tasks, one cannot speak of rule-governed behavior. On this view, previous familiarity with numerous exemplary words is required before a rule can be abstracted. For infrequent lexical items, this process may take a long time. Meanwhile, one may witness perfect performance with familiar items. In other words, one cannot speak of rule extraction in the process of acquiring inflections of real words at least for those sub-systems that were studied.[1]

Most interesting with regard to the discrepencies found between speakers' performance with real and nonce words are the few studies which have looked at the ways adults handle nonce word questions. Haber (1975) found that educated adults did not do well at all on Berko's tests (1958). Their correct responses ranged from 53 percent to 100 percent for the various items. Furthermore, the results could be predicted neither by frequency nor by errors found in the subjects' naturalistic language. The subjects were internally inconsistent in their replies and no consistency was found between groups of subjects. Similar findings for adults were reported by Ivimey (1975). Derwing (1977)

reports on a pilot study in which he found that adult subjects treat nonce words as either jokes which do not deserve a serious answer, or as analogous to extremely exceptional forms. It seems that nonce words presented to adults in an experimental situation may trigger responses that are linguistically uninformative.[2]

Nevertheless, one would not want to say that adult speakers do not know the system, in the sense of being able to produce a rule-governed behavior with novel items (Snow, 1980). The incompatibility between subjects' free speech and their responses in nonce word tests requires a different explanation.[3]

The studies that I shall report about in the following sections were designed to test the hypothesis that the incompatibility between the way older children speak their language and the errors that they make with nonce words, although in itself an interesting phenomenon, is not pertinent to the development of their linguistic knowledge.

The data to be presented below reports on the performance of two groups of Hebrew-speaking children, mean ages 7;4 and 1;7, who were tested for their knowledge of inflectional morphology by means of typical wug-tests. While the older group was well in control of these forms in their natural speech, the younger children were still in the process of acquiring them.

Facts concerning Hebrew plural formation

All nouns in Hebrew are either masculine or feminine and form their plural accordingly. Masculine nouns usually take an /im/ suffix for plural, while feminine nouns typically take an /ot/ suffix for plural.

The grammatical gender of the nouns is usually determined by the phonological features of the final syllable. Thus, nouns ending in a stressed /a/ or in /t/ are generally feminine.[4] All other nouns are generally masculine. Table 1 gives some examples of typical masculine and feminine Hebrew nouns.

Insert Table 1 about here

Internal vowel reductions or vowel changes in the stems often occur when the plural suffix is added, as a result of an obligatory movement of the stress to the plural morpheme. The inflectional system is fairly regular, though exceptions exist.

In inanimate nouns, gender distinctions are, of course, semantically empty. In animate nouns, however, natural gender overrides all other considerations and fully determines grammatical gender.

The developmental pattern of Hebrew plurals - A summary

The acquisition of Hebrew plurals was studied longitudinally and cross-sectionally (Levy, 1983). It was found that Hebrew learners typically acquire pluralization in their third year of life. During the period of acquisition the children pass through stages in which they gradually master the formal system which determines the choice of a plural suffix in Hebrew. They learn exactly what features of the noun final syllable they should attend to for correct pluralization. During this period, they seem insensitive to considerations of natural gender and its effects on the choice of plurals for animate nouns. The developmental pattern across the children that were studied (Levy, 1983; Berman, 1984) progressed as follows:

1. Attachment of the typically masculine /im/ plural suffix to all nouns alike. No change was made to the stem: The /im/ suffix was "glued" onto the singular form irrespective of the phonological features of the noun's final syllable. For example:

kadúr	kadurím	"balls"	mas.
aqalá	*aqalaím	"cart"	fem. (correct: aqalot)
tabáat	*tabáatim	"ring"	fem. (correct: tabaot)

2. Singling out the /a/ ending nouns as requiring an /ot/ suffix for plural while all other nouns take the /im/

suffix. The final /a/ of the singular is appropriately dropped when the /ot/ suffix is added but no internal vowel changes are introduced to the stem. For example:

tmuná	tmunót	"picture"	fem.
karít	*karítim	"pillow"	fem. (correct: kariyót)
rakévet	*rakévetim	"train"	fem. (correct: rakavót)

3. Adding an /ot/ suffix to some /t/ ending nouns. Still no internal vowel changes in the stem. For example:

rakévet	*rakevót	"train"	fem. (correct: rakavót)
kapít	*kapítim	"teaspoon"	fem. (correct: kapiyót)
máxat	*máxot	"needle"	mas. (correct: mexatím)

The child's treatment of the noun máxat as a typical /t/ ending noun, which it is not since it is spelled with a tet and is masculine (See Figure 4), shows that he has formed a hypothesis concerning the determinants of the choice of /ot/ suffix for plural.

4. Realizing the full range and variety of noun pluralization. As a result, some confusion in forms which have previously been inflected correctly is apparent. Internal vowel changes to the stem are attempted, though errors still abound. The following examples each show a single child's variety of plural forms for one noun.

rakévet--*rakevót, *raxavót, *rakévetot "train" fem.
(correct: rakavot)

karít -- *karitót, *karítim "pillow" fem.
(correct: kariyót)

STUDY 1

Method

Considering the observed pattern for the development of plurals (Levy, 1983; Berman, 1984), the following set of predictions can be proposed that will test the hypothesis that inflecting nonce items at a later developmental stage essentially recapitulates the course of development that the child has gone through in learning to inflect real nouns:

a. The children will do better on "masculine" nonce nouns that take /im/ for plural than they would on the various "feminine" nonce nouns (stages 1-2 in the developmental pattern).

b. Error-free performance with "feminine" nonce words will be first found on /a/ ending nouns, second, on /et/ and /at/ nouns, and third on /it/ nouns (stages 3-4 in the developmental pattern).

c. Internal vowel changes will be introduced only by subjects who show error-free performance in their choice of plural suffixes.

Subjects. Thirty-one second graders, 15 boys and 16 girls (mean age 7;4; range 7;0-7;10) were tested for their ability to inflect nonce words. The children were all born in Israel, spoke Hebrew as their first and only language and came from educated middle-class families.

Procedure. The children were tested individually during school hours. The questions were of the following forms:

> Experimenter: "I am thinking of an X. Say X (the child repeats the nonce noun X). Now I am thinking of another one. What am I thinking of now, two ...? (or Now I have two _____?, etc.)."

Some questions with nonce verbs were posed to the children as well using a similar procedure (but see next section):

> Experimenter: "Let's say that the boy is Xing. Say X (the child repeats the nonce verb X). So the girl is _____?"

Thus our method was similar to the method in Solomon (1972) and Snow (1980) which presented the nonce words without suggesting what their meanings might be.

After the first 12 questions, there was a break in which the child was asked questions about his family and his plans for the coming vacation. The test was continued thereafter. The children were given sweets as a reward for participating in the study.

The test consisted of 14 nonce nouns and 10 nonce verbs, randomly ordered. The nonce nouns were morphologically "masculine" and "feminine." The various feminine nouns exhibited all possible feminine endings. The verbs were in the present tense and of non-defective roots.[5]

Table 2 gives the nonce nouns that appeared in the test together with their appropriate plural forms. The verbs are omitted from this table since they are only of secondary interest for this study (but see next section).

A two-hour sample of classroom conversation including short stories told by individual children, as well as free speech during a variety of card games played in small groups, was recorded and analyzed. The analysis revealed no errors in plural forms of nouns by the chilren. We concluded from this sample that these seven-year-olds knew how to form plurals in naturalistic speech.

Insert Table 2 about here

Results

Three subjects had to be discarded from our sample since, instead of alternating forms in their responses, they simply repeated the stimuli.

The two most striking findings concerning the remaining subjects were:

a. Not a single subject performed well with the nonce nouns.

b. Almost no one made errors on the nonce verbs. Infrequent repetitions of the verb stimuli constituted the only type of difficulty detected for verbs.

The striking differences between the children's responses to the verbs and the nouns was probably due to the simplicity of the verb task, since the questions that were asked required either the addition or the subtraction of an /et/ suffix and nothing more. For example:

question form: mekarém (he) answer: mekarémet (she)

question form: mitkalémet (she) answer: mitkalém (he)

Still, these findings are interesting since the perfect performance with the verbs attests to the fact that on the whole, the children understood the task and were cooperating. Thus, the errors in the noun-test seem to arise from the complexities of the specifics of handling the nonce nouns, rather than from a global misconception of the task.

Two distinct patterns were characteristic of the way the children handled the nonce nouns:

I Fourteen subjects added an -/im/ suffix to all the nonce nouns. As a result the "masculine" nouns were inflected correctly while the "feminine" nouns were all incorrect. I shall return to this group later.

II Fourteen subjects did not use any uniform strategy. They added an /im/ suffix to most of the "masculine" nouns and gave a variety of responses to the "feminine" nouns.

The developmental pattern that was presented above predicts that knowledge of the plurals of /a/ ending nouns

precedes that of /it/ and /et/ ending nouns. The data from our seven-year-olds does not reflect the predicted pattern. Contrary to prediction two, no consistency was found between subjects as to the items they did worst on. (See Snow, 1980, for similar findings in Dutch children.) For example, five subjects gave the correct plurals of the nouns ending in /it/; two gave the correct plurals for the nouns ending in /et/. These subjects made errors in the plurals of all the nouns ending in /a/, contrary to prediction one. Furthermore, five of the seven subjects introduced well-motivated vowel changes in the stems of the nouns ending in /t/, (i.e., akamít-akmiyót; batéket-batakót), contrary to prediction three. The most striking example was provided by one subject who gave the correct and most difficult form akmiyót, while giving the juvenile *batéketim and suffixing -/im/ to all the nouns ending in /a/! Four subjects inflected correctly the /it/ nouns but made errors on some of the /a/ nouns, while one subject inflected correctly the /et/ nouns but made mistakes with some of the /a/ nouns. Three subjects did poorly on all the "feminine" nouns giving a variety of responses: repeating some stimuli, inflecting correctly some of the /a/ nouns while adding a masculine /im/ suffix to the others.

In sum, predictions one-three were not supported by these seven-year-olds' performance with nonce nouns. The

ways in which they handled the nonce items showed no similarity to the independently observed developmental pattern.

The 14 subjects who chose to add an -/im/ suffix to all the nonce nouns irrespective of their forms can, on the face of it, be cited as coroboration of prediction one. However, since these children showed perfect performance with real words and with the nonce verbs in the test, their total inability to handle feminine nonce nouns can not be taken at face value. A response bias is equally unlikely to have caused such performance since verbs and nouns were randomly arranged in the test. The behavior of these subjects will be followed up in the discussion.

In sum, the children's performance on the nonce items varied between 50 percent correct replies for the subjects who added the /im/ suffix to all the nouns and as high as 85 percent correct replies for the subjects who did vary their responses in accordance with the last syllable of the nonce item.

STUDY II

Method

Subjects. Twenty-three two-year-olds (mean age 2;7, range 2;0-2;11) participated in the study. The children were all first born, of middle-class families and attended a morning school (which is customary is Israel for two-year-olds). They were tested individually for their ability to give plural forms of real and nonce nouns.

Procedure. The procedure was similar to the one used with the seven-year-olds. Since we expected difficulties with the two-year-olds when no concrete material was used, the children were tested twice, once without toys and once with toys, with a interval of 10 days between the two tests. The test consisted of 16 real nouns, which served to establish the children's knowledge of inflections in their language (Levy, 1983) and of eight nonce nouns (Table 2, items: 1, 2, 5, 7, 9, 10, 11, 12).

A strong correlation was found between the children's performance in the two tests, with and without the toys (X^2 (15) = 32.66, $p<.0052$). The two procedures were therefore considered equivalent. The findings in the next section concern the test without the toys.

Results

Three subjects had to be discarded from the sample since, instead of giving answers, they simply repeated the stimuli.

The 20 remaining subjects adhered in their performance with real nouns to the developmental pattern for the acquisition of plural forms of nouns that was independently observed (Levy, 1983). Thus, they provided a replication of the previous studies. Contrary to the second graders, these two-year-olds were clearly still in the process of acquiring pluralization. Their inflected nouns revealed predictable errors. For example:

			Correct Plural	Child's Plural	
1.	rakévet	(fem.)	rakavót	*rakévetim	"train"
2.	tabáat	(fem.)	tabaót	*tabáatim	"ring
3.	kos	(mas.)	kosót	*kosím	"cup"

Example three is of an exceptional noun that takes /ot/ despite its non-feminine ending in the singular. Children exhibit rule-governed behavior when they inflect these and similar exceptions as they would inflect regular nouns. So despite the fact that some of the exceptional nouns are indeed very common, e.g., beitzá-"egg"; kir--"wall"; kaf--"spoon", two-year-olds often produce *beitzót, * kirím, *kafím.

Somewhat unexpected findings, with regard to the children's performance with nonce nouns, was the fact that they cooperated on the test and seemed to understand what was required of them. Less surprising was the fact that the two-year-olds differed from the second graders on the nonce test:

a. They showed occasional difficulties with "masculine nonce nouns that take /im/ for plural as well as with the "feminines," producing forms such as *šamonót, *xékelot.

b. Recall that the /t/ ending feminine nouns that appeared in the test were expected to be most informative with regard to the children's knowledge of pluralization in Hebrew. It was particularly interesting to see whether /t/ ending nonce nouns such as *batéḱet and *cafáat received the same plural suffixes as their real analogues: rakévet--"train" and tabáat--"ring." Of the 20 children in our study, one subject did not inflect these nouns at all (nor, in fact, any other nonce noun); one other subject gave correct plurals of the /t/ ending nonce nouns but erred on their real noun analogies. The other 18 subjects showed similar patterns of response to both types of nouns. For example, children who were making errors with real /t/ ending nouns producing forms such as *rakévetim (for the correct: rakavót--"trains") and *tabáatim (for the correct:

tabaót--"rings"), also produced bateketim and cafaatim (for the correct nonce-plurals: batakót and cafaót.)

An overall comparison between the children's performance with real nouns and nonce nouns was significant at the .02 level (X^2 (20) = 34.05). So, it seems that contrary to older children, two-year-olds treat nonce nouns naturally and produce similar plurals for similar nouns, whether those are familiar or strange nouns.

The only children who introduced internal vowel changes to the stems were the ones who performed perfectly with the real and the nonce nouns. There were only two such subjects. This too is in accordance with the predictions on p. .

Summary and Discussion

Our data show that seven-year-old Hebrew speakers make errors in pluralizing nonce nouns which are very different from the ones predicted by an independently established pattern of development of pluralization in two- to three-year-olds that was observed in the course of natural language learning. On the other hand, two- to three-year-olds give a similar pattern of responses to real and nonce nouns. The errors that the younger children make are precisely in the directions predicted by the course of natural language acquisition.

Thus, the working hypothesis that allowed researchers to interpret results obtained through testing older children on nonce words as relevant, or even as mirroring, development with real language seems problematic. The possibility that we are dealing with unrelated phenomena, that of learning a system, which occurs ages at two to three, vs. that of handling a test that requires that same knowledge, cannot be ruled out.

In fact, differences in the performance of older subjects who have mastered language and that of subjects still in the process of acquisition ought to be expected in view of current theories on the development of cognitive skills, including language. Such theories claim that skilled cognitive performance is achieved when knowledge becomes procedural and automated, at which point conscious access into the system is not easily achieved. Consider, for example: Hayes-Roth's (1977) theory which assumes that learning commences with the establishment of memory representations of the elementary knowledge structure. As learning progresses, these elementary representations become stronger and relational associations are established among them. Ultimately, with increased experience, "a particular configuration can be strengthened to the point of 'unitization': The configuration then acts as a discrete, all or none activatable memory representation" (p. 201),

that, when circumstances require, can be decomposed into its prior constituents (p. 201). Schneider and Shiffrin (1977) discuss automatic and controlled cognitive processes. In their theory, an automatic system is a permanently established sequence of nodes that is activated by input that is externally or internally generated, but is then executed with no control by the subject. A controlled process is a temporary sequence of nodes activated under control of, and through attention by the subject. Automatic processes are learned following the earlier use of controlled processing that link the same nodes in a sequence. Seuren (1978) presents a model of cognitive processing in which Central Control procedures (CC) are distinguished from Routine Procedures (RP). Linguistic performance such as morphological operations are instances of RP's which, in Seuren's view, are generally not open to introspection and may be quite specific in nature.

While the distinction between automatic and controlled behavior places most naturalistic use of language within routine procedures which have become automated through highly frequent use, it is not clear where it puts verbal testing, specifically of the kind used in nonce word tests.

Consider the task of inflecting real and nonce words: The morphological processes in a fluent speaker, e.g., plural formation, are Routine Procedures in Seuren's sense

(1978), that are activated by words in the language (Hayes-Roth, 1977). It is possible that nonce words fail to trigger such routines.[6] Notice that nonce words resemble real words formally, but typically lack an established semantics. This was the case in the procedure used in our studies as well as in studies such as Solomon (1972) and Snow (1980). Likewise, in Berko's classical study and the work that had followed, the presence of pictures of odd tools, animals, etc., might have lended more credibility to the unfamiliar "words" but was hardly comparable to an established sound-meaning relationship that was in the child's lexicon, i.e., familiar words.

Inflecting nonce words becomes, then, a typical problem-solving situation with the following characteristic features: Subjects will try to identify the goal of the behavior (Anderson, 1980). Hence, the finding of Derwing whose subjects considered the test either as some kind of a joke or as requiring bizarre analogies (Derwing, 1977). Subjects will not be able to apply the relevant automatic process since the input will not trigger it, and therefore will revert to controlled behavior (Schneider, et al., 1977), in the course of which they will have to decompose the "unitized assembly" and detect the correct sub-routine, i.e., a particular rule for a given instance (Hayes-Roth,

1977). Identification of the correct sub-routine will enable them to inflect a given nonce word.

Thus, the intuitive feeling of researchers in child language that responding to a wug-test requires linguistic awareness on the part of fluent speakers (E. Clark, personal communication) seems correct. It seems that the inadequacy of the trigger, i.e., the nonce items, as an appropriate activator of the automatic procedure, reverts it into a controlled behavior in which the subject slowly and sometimes maybe even consciously, searches for ways to answer the wug-questions.

If this analysis is correct, we cannot simply assume that the results obtained from older children on these tasks indeed reflect upon the developmental course that they had gone through when they acquired the same forms in real language. The task of "decomposing an established procedure" (Anderson, 1980) in order to gain access into one of its subroutines is very different from ordinary language usage, as well as from responding to questions with real words. One of the basic differences lies in the types of errors that one can make. Thus, in a controlled search, a subject may mistakenly choose the wrong sub-routine, or he may decide on certain heuristics--such as, picking the most frequent sub-routine to avoid extra effort. I believe that these kind of tactics were adopted by those seven-year-olds in our

study who added an /im/ suffix to all the nonce nouns, feminine and masculine alike.

Clearly, fluent speakers can inflect nonce words correctly for some or all items, especially if given enough time and a few rounds of trial-and-error. But, they may also produce erroneous behavior which will simply be the result of using the wrong tactics in their search for the right routine. Such behavior will be irrelevant to the learning process as well as to the present state of their knowledge, as reflected in natural use. For example, the requirement to revert to a non-automatic procedure in order to find the correct analog of the nonce word may involve meta-theoretical principles of organization with which the subject may be working routinely in execution of verbal tasks such as answering questions on a grammar test, writing compositions, etc., but not necessarily in producing speech. On the other hand, low-level generalizations as well as heuristics having to do with surface notions of similarity, may be playing very different roles in the learning process and in the conscious search into an establishing verbal procedure.

Let us now consider our two-year-old subjects who were still in the process of acquiring inflectional morphology. These children treated real and nonce words alike and submitted both types of stimuli to the same operations which

they only partially controlled. For the young subjects in our study, the fact that the nonce words had unspecified meanings did not block access into the rule system that they were currently using to pluralize nouns. Since the procedure had not yet been fully acquired and in high-frequency use, it had not been automatized and access was still relatively easy (Seuren, 1978). The insight offered by Anderson (1980), and Ericssen and Simon (1980) seems relevant in this case, too:

> With increase in experience with a task, the same process may move from cognitively controlled to automatic status, so that what is available to the novice may be unavailable to the expert (Ericsson & Simon, 1980, p. 235).

This fact is all too familiar in chess games and bicycle riding. The results obtained in the present study suggest that it may be the case with language as well.

In sum, it has been claimed in this paper that the ways in which speakers of different ages and different degrees of fluency in a language, handle questions that use nonce words attest to the internal status and organization of their linguistic knowledge. In fluent speakers, the linguistic system is basically a closed system. The automatic activation of parts of this system depend crucially upon the appropriate triggers. Gaining access into this system by means of an inappropriate trigger (e.g., nonce noun) requires a controlled operation which is an intentional

effort that is presumably conscious or can easily be brought to consciousness (Seuren, 1978; Ericsson & Simon, 1980). However, in learners, the system is still open. The notion of "appropriate trigger" is not yet well-defined and the operations have not yet become automatized. Newly encountered instances are routinely handled in terms of the available, albeit partial, knowledge.

Berko's ingenious technique offers a good measure of a speaker's internalized knowledge when it is used with subjects who are still learning the language. For fluent speakers, however, the task becomes a typical problem-solving situation which may not in itself be uninteresting. For example, it can instruct us on what portions of the linguistic system can be approached through controlled behavior, what tactics do speakers commonllly use, and whether there are any problems, but it no longer offers much insight into the early developmental processes.

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Footnotes

[1]Presumably the assumption is that the learning of morphology in the early stages is accomplished through rote-memorization. Notice that this argues against much current work on the development of inflectional and derivational systems (as summarized in Slobin, 1984).

[2]Can this pattern of responses be typical of the ways in which speakers handle new words, in general? Since unfamiliar words are most likely to occur in the course of conversation, in a fully elaborate semantic and pragmatic context, I do not believe that the tasks can be equated. While in the course of natural conversation, speakers, particularly fluent ones, can use "stalling" behavior and delay usage of an unfamiliar item, the experimental situation is devoid precisely of these elements of the context, while it insists on obtaining replies within a short time.

[3]Although Berko formed her answer key by obtaining adult responses to her test items, this is different from actually testing them. This point will be further discussed in the last section of this paper.

[4]In modern Hebrew the /t/ sound may have its historical origin either in an emphatic /t/ spelled as tet, or in a stop /t/ spelled as tav. Nouns that have final tet are masculine. Those are considerable less numerous than the tav ending nouns.

[5]Hebrew forms its verbs, indeed most of its vocabulary, from consonantal roots cast in seven different verb patterns, binyanim, which are often morphologically opaque. This opacity is a feature of "defective" roots in which one or more consonants may be either entirely missing or transformed, for a given derivation. In the present study, defective roots have been avoided.

[6]An account of the production of plurals which suggests that for known words, the child had stored plurals along with the singulars and need not operate a rule system should not affect the claim that is being made here. If one believes that this is the case, then inflecting real words would not necessarily trigger the activation of the relevant assembly. However, developmental studies show that children do acquire morphological rules, hence, the procedure is there, whether the child will choose to use it or prefer to search his storage for a rote form.

Table 1: Masculine and feminine Hebrew nouns

	Singular	Plural	
Masculine	sus	susím	'horse'
	katár	katarím	
	xéder	xadarím	'room'
Feminine	agalá	agalót	'cart'
	rakévet	rakavót	'train'
	karít	kariyót	'pillow'

Table 2. Nonce noun test administered to 2nd graders

	Singular	Plural
* masculine	1. banág	banagím
	2. maksexax	maksexím
	3. šamón	šamoním
	4. makrém	makremím
	5. situk	situkím
	6. xékel	xakalím
* feminine	7. doná	donót
	8. makta	maktót
	9. mindará	mindarót
	10. akamít	akamiyót
	11. bateket	batakót
	12. cafáat	cafaót
	13. šlaxit	šlaxiyót
	14. katémet	katamót